EFFECT OF TWO DISTINCT RUNNING RETRAINING INTERVENTIONS ON RUNNING-RELATED INJURIES IN RECREATIONAL ENDURANCE RUNNERS: A THREE-ARM RANDOMISED CONTROLLED TRIAL WITH A ONE-YEAR FOLLOW-UP

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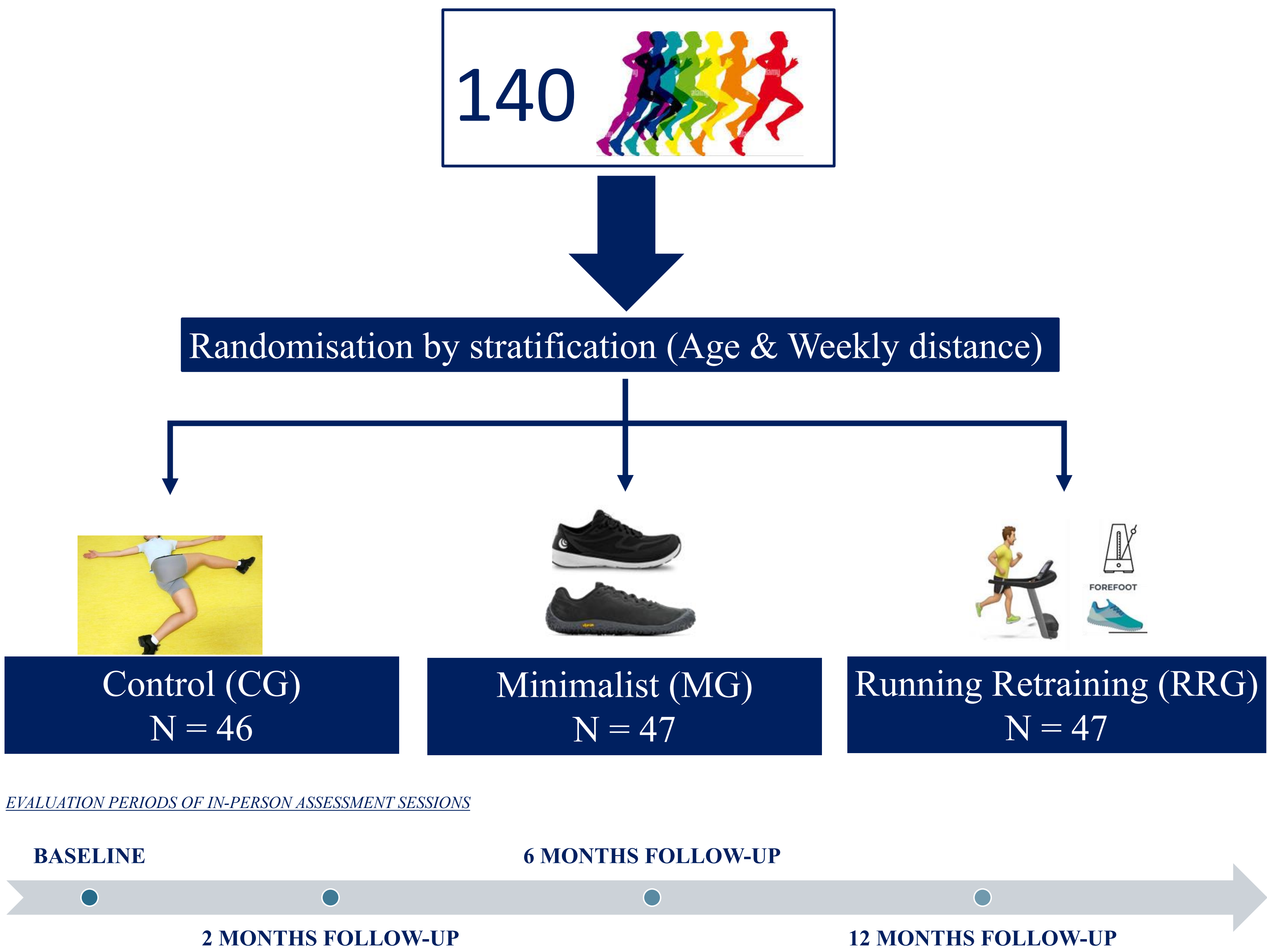[1]LAM – Motion Lab, Liège, Belgium. E-mail: guillaume.abran@uliege.be.

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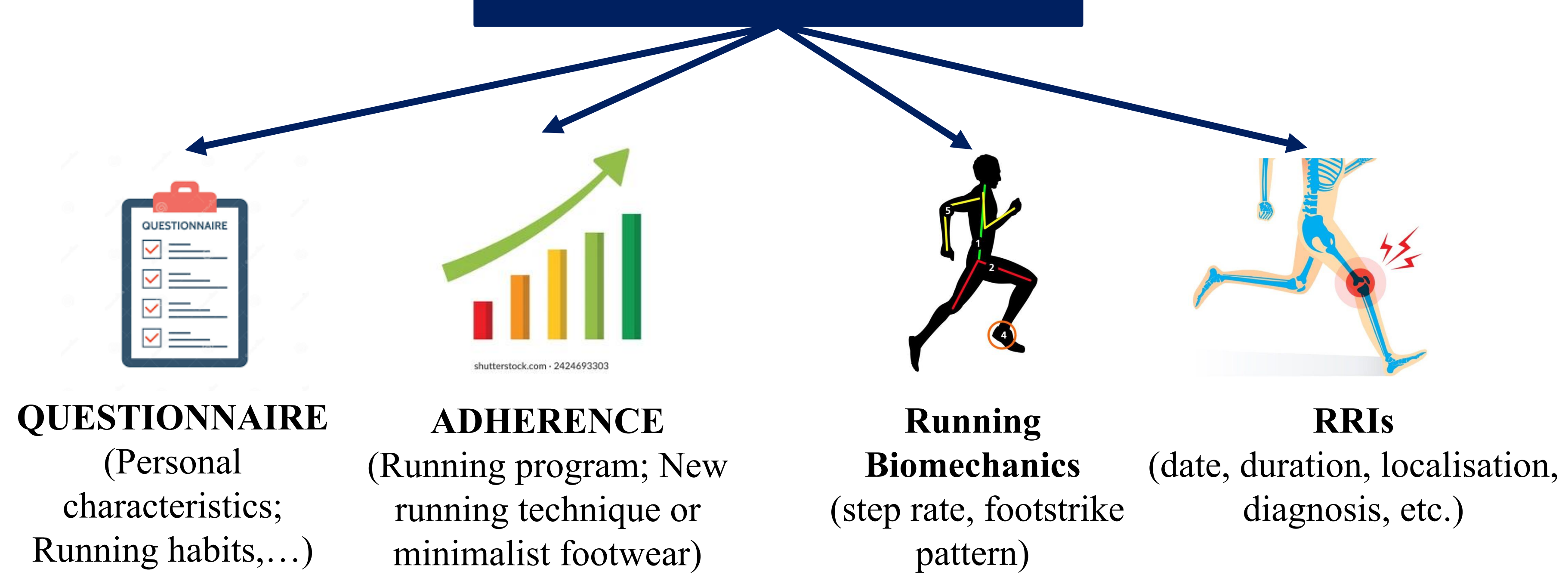
INTRODUCTION

Many experts and athletics coaches support running with a forefoot striking pattern, greater cadence, and minimalist footwear to reduce the risk of running-related injuries (RRIs) [1][2]. The objective of this study was to explore the effect of a running retraining intervention or transition to minimalist footwear on RRIs incidence.

METHODS

140

Randomisation by stratification (Age & Weekly distance)

Control (CG)
N = 46

Minimalist (MG)
N = 47

Running Retraining (RRG)
N = 47

EVALUATION PERIODS OF IN-PERSON ASSESSMENT SESSIONS

BASELINE

6 MONTHS FOLLOW-UP

2 MONTHS FOLLOW-UP

12 MONTHS FOLLOW-UP

DATA COLLECTION

QUESTIONNAIRE
(Personal characteristics; Running habits,…)

ADHERENCE
(Running program; New running technique or minimalist footwear)

Running Biomechanics
(step rate, footstrike pattern)

RRIs
(date, duration, localisation, diagnosis, etc.)

RRIs definition: Running-related (training or competition) musculoskeletal pain in the lower limbs or in the back that causes a restriction on or stoppage of running (distance, speed, duration or training) for at least seven days or three consecutive scheduled training sessions, or that requires the runner to consult a physician or other health professional [3].

Two types of statistical analyses: Intention-to-treat analysis (respect the randomisation process but does not consider adherence to the intervention) **& As-treated analysis** (does not respect the randomisation process but consider the adherence to the intervention)

RESULTS

At baseline, no difference was found between groups for age ($P = .72$, $\eta^2 = 0.005$), sex distribution ($P = .33$, $X^2 = 2.18$), running experience ($P = .94$, $\eta^2 = 8.13 \times 10^{-4}$) and comfort speed ($P = .28$, $\eta^2 = 0.018$).

No difference was found between group across the four evaluation periods for BMI ($P = .15$, $\eta^2 = 7.12 \times 10^{-4}$), weekly distance ($P = .14$, $\eta^2 = 0.003$) and running volume ($P = .28$, $\eta^2 = 0.004$).

Table 1: Cox Regression Results for the Primary Outcome According to the As-Treated and Intention-to-treat analysis [a].

Covariates		Model 1 (Unadjusted)		Model 2 (Adjusted)	
		HR (95% CI)	P	AIC [f]	HR (95% CI)	P	AIC
AS-TREATED ANALYSIS							
All injuries [b]				353.5			356.1
Interventional group [c]	MG	0.70 (0.35-1.38)	0.31		0.69 (0.34-1.37)	0.29	
	RRG	0.57 (0.30-1.06)	0.07		0.44 (0.21-0.91)	**0.02**	
	Age	Not included	-		0.97 (0.94-1.00)	0.11	
	BMI	Not included	-		1.08 (0.96-1.20)	0.16	
	Distance [d]	Not included	-		0.99 (0.98-1.01)	0.91	
Likelihood ratio test			0.2			0.2	
INTENTION-TO-TREAT ANALYSIS							
All injuries [e]				353.8			356.5
Interventional group	MG	0.74 (0.37-1.45)	0.38		0.69 (0.34-1.38)	0.30	
	RRG	0.56 (0.29-1.08)	0.08		0.44 (0.21-0.91)	**0.02**	
	Age	Not included	-		0.97 (0.94-1.00)	0.11	
	BMI	Not included	-		1.08 (0.96-1.21)	0.16	
	Distance	Not included	-		0.99 (0.98-1.01)	0.91	
Likelihood ratio test			0.2			0.3	

[a] =Model 1 included only the group as a predictor; model 2 included all predictors. HR values < 1 indicate a lower injury (hazard) ratio. 95% CIs (lower–upper bound). MG = minimalist group; RRG = Running retraining group; HR = hazard ratio; P = p-value;
[b] = No. of injuries = 57; No. of participants in the analysis = 129.
[c] = Control group is reference.
[d] = Mean of weekly distance reported by runners at each evaluation session attended.
[e] = No. of injuries = 57; No. of participants in the analysis = 140
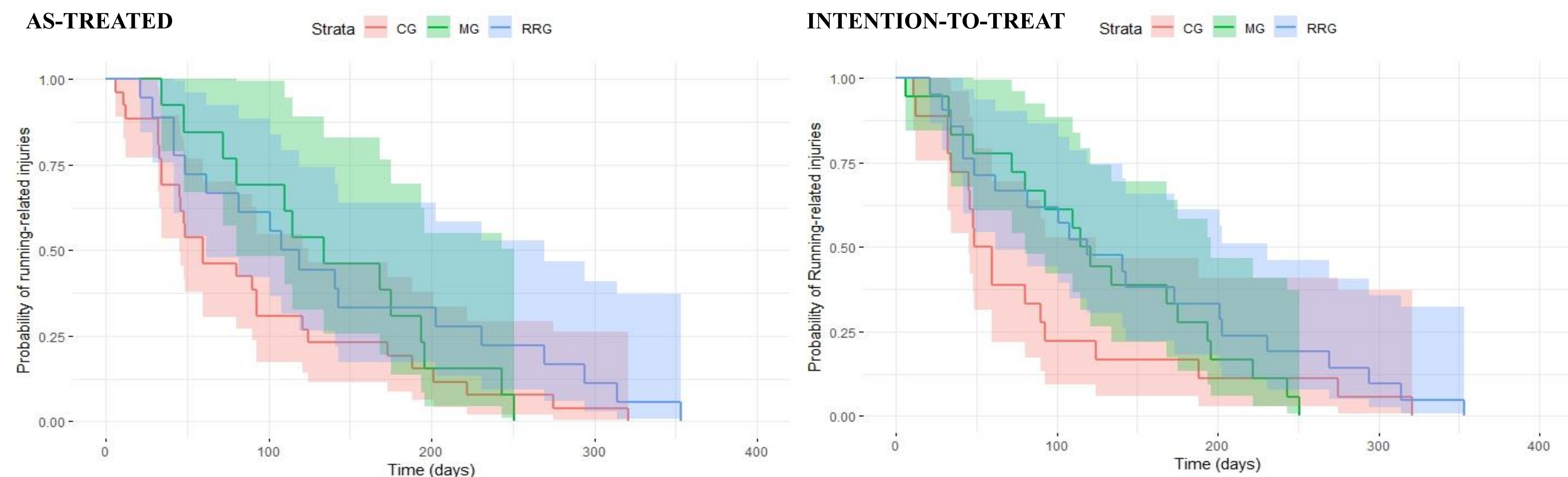[f] = Akaike Information Criterion.

Figure 1: Kaplan-Meyer curves show the probability of running-related injuries in the CG, MG and RRG as a function of time in days with the as-treated (left) and intention-to-treat (right) analysis.

The Fisher's exact test also showed that the number of overuse foot RRI was different between groups (CG (N = 5) vs MG (N = 8) vs RRG (N = 12); $P = .017$) in as-treated analysis. Post-hoc analysis showed that a significant difference exists between CG and RRG ($P = .018$).

KEY FINDINGS

- Transition to minimalist footwear or adoption of a softer running technique do not decrease the incidence of RRIs.
- Transition to a softer running technique increases the risk of overuse foot RRIs.
- Next step: Determine whether foot-ankle characteristics are risk factors for transitioning to minimalist footwear or running retraining.

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This study is a part of my PhD thesis titled: "Running retraining intervention: when, how & for whom ?"